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Reconciling democracy and sustainability: three political challenges and the role of democratic innovations

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ABSTRACT

Governing sustainability challenges such as climate change or biodiversity loss presents a profound democratic dilemma. Although democratic practices and procedures are widely regarded as essential for collectively addressing complex sustainability issues, liberal democracies have been criticized by some scholars for their inability to effectively tackle global environmental threats like climate change. We reconcile these positions by outlining how the emerging field of democratic innovations can help to address the critical challenges that democracies face when governing sustainability transformations. We focus on three issues liberal democracies are confronted with: reformist incrementalism, (de)politicization, and imaginary boundaries. We then exemplify how democratic innovations such as deliberative mini-publics, participatory budgeting, and material participation can help address these challenges. Our review suggests that democratic innovations hold the potential to address political concerns, find compromises between extreme positions, reconnect people's everyday lives with the grand sustainability challenges they face, and allow for alternative visions of a desirable future society. However, we also address cautionary tales, discuss the limitations of democratic innovations, and outline avenues for future research, which we believe can help further elaborate and develop participatory approaches to critical sustainability challenges.

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Introduction

The last several decades have shown the world's incapability to address complex sustainability issues like climate change or biodiversity loss. Despite countless national and multilateral pledges, we face an increasingly dramatic socio-ecological crisis (IPCC 2023). Liberal democracies have been criticized by scholars like Giddens (2009), Shearman and Smith (2007), and Lindvall (2023) for being ill-equipped to address sustainability concerns due to slow administrative processes and cumbersome forms of inclusion, participation, and deliberation. In light of a growing gap between ineffective democratic and participatory approaches and the urgent action required to address

global sustainability threats, these debates have led to calls to legitimize authoritarian power to tackle climate change (e.g., Mittiga 2022). Yet, other scholars discuss ecological democracy (Pickering, Bäckstrand, and Schlosberg 2020) or democratic deliberation (Hammond 2020) as ways to deepen people's engagements with sustainability transformations. Empirically, studies on the links between democratization and emissions reduction suggest that a democratic regime type has no positive, or at least uncertain, effect on reducing greenhouse gases (Lindvall and Karlsson 2024). Contributing to ongoing debates about the relationship between sustainability transformations and democracy (see Goetz et al. 2020 for an

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overview), we discuss whether and how democratic innovations can help address some of the key challenges we currently see when tackling grand sustainability issues like climate change and biodiversity loss.

At a time of liberal democratic decline, the need to revisit the relationship between sustainability and democracy is particularly urgent. In recent years, scholars have identified the rise of populism and polarization as a fundamental challenge to the political legitimacy of established democratic norms and procedures (Levitsky and Ziblatt 2018). Simultaneously, Blühdorn (2007) criticizes liberal democratic structures themselves for being inherently symbolic and unresponsive to individuals' needs, regardless of whether it comes from citizens or non-citizens.¹ Scholars have pointed out the "erosion of political support" (Dalton 2004) and "democratic regression" (Schäfer and Zürn 2021), particularly in Western democracies. Consequently, contemporary discussions on the relationship between democracy and sustainability should not only address external threats (Marquardt and Lederer 2022) but also focus on the internal limitations related to political representation and responsiveness, which necessitate new forms of democratic decision-making (Machin 2022). In this context, we explore how democratic innovations present potential solutions while highlighting their critical limitations.

Given the growing debates about ecological democracy and the need to democratize sustainability transformations (Pickering et al. 2022), we discuss the potential and limitations of democratic innovations, which we understand as "political innovations' in representative regimes" (Alexandre-Collier, Goujon, and Gourgues 2020). They encompass "processes or institutions that are new to a policy issue, policy role, or level of governance, and developed to reimagine and deepen the role of citizens in governance processes by increasing opportunities for participation, deliberation and influence" (Elstubb and Escobar 2019). The search for innovative democratic approaches, such as deliberative and inclusive decision-making processes, has been ongoing for several decades (Fung 2005), as methods to strengthen democracy and address trends of eroding trust and declining voting participation. In recent years, the aspiration to find new forms of democratic governance has also been motivated by the failure of existing democratic institutions to tackle the ongoing challenges of climate change and biodiversity loss (e.g., Orr 2023). At the same time, the coinciding crisis of democracy, manifested by the backsliding of global freedom (Freedom House 2022; EIU 2023), and the ecological crises, bring these two different interests of democratic vitalization together. While research on democratic innovations within the field of sustainability has been growing in recent years, partly due to an increasing

interest in citizens' assemblies and similar deliberative practices, there is a need for a broader discussion about different democratic innovations.

Essential questions remain, moreover, about the extent and in what ways different types of innovations can address critical challenges standing in the way of more transformative sustainability politics. In this article, we contribute to these debates by exploring the potential and pitfalls of three democratic innovations to help address three essential challenges of governing pressing sustainability issues: *reformist incrementalism*, *(de)politicization*, and *imaginary boundaries*. This contribution is essential and timely as the intrinsic and practical value of citizen participation and deliberation in political processes are challenged by authoritarian, populist, and ecomodernist politics. Thus, the article intends to foster a more balanced (academic) debate on how to reconcile democratic politics and sustainability. Rather than contrasting cumbersome democratic processes with the need for urgent solutions, we place people and their interactions at the center of the debate around the potential of democracy to mitigate sustainability challenges.

We hold on to the idea that democratic engagement and inclusion can help us cope better with sustainability challenges. Given the intrinsic value of democratic systems and the profound difficulties of tackling sustainability issues, democratic innovations may have the potential to go beyond traditional forms of representative democracy and embrace deliberative approaches that trigger conversations and support active participation. We present democratic innovations as avenues that should be further explored when addressing shortcomings in liberal democracies to tackle sustainability issues (as articulated by scholars like Eckersley 2020).

In the following section, we revisit three "challenges" to democratic decision-making put forward in sustainability governance research. In the third section of this article, we introduce three specific democratic innovations and put them into conversation with the previously outlined challenges. In the fourth section, we formulate general lessons from these innovative democratic practices, and in the concluding section, outline avenues for future research. Rather than asking if democracy can tackle grand sustainability challenges like climate change, we aim to reconcile sustainability with democracy by fostering a debate about the prospects and limitations of democratic innovations.

Democracy and sustainability: three political challenges

Before diving into the three challenges, we offer a conceptualization of sustainability that guides our

arguments. Broadly following the almost 40-year-old definition of the Brundtland Report (WCED 1987), sustainability refers to the conditions that allow the needs of current generations to be met while still giving future generations a chance to meet their needs. Sustainability challenges represent all developments that threaten this commitment or, to paraphrase the words of Rockström et al. (2009), that push the planet out of a safe operating space for humanity. Technological innovations and incremental changes in line with the ecological modernization paradigm will likely not be sufficient to achieve sustainability and planetary health (Mol and Spaargaren, 2000; Dana R. Fisher and William R. Freudenburg, 2001; Jänicke, 2009). Instead, a broader understanding of sustainability transformation opens the realm of inquiry to systemic changes. It challenges the status quo of the existing social and political order in which global environmental threats like the climate crisis have emerged (Stoddard et al. 2021; Fahrmeir 2020). Such transformations encompass ecological, economic, and social objectives and political change (Patterson et al. 2017). Thus, we conceptualize sustainability as entailing transformative changes understood as “fundamental systemwide reorganization across technological, economic, and social factors, including paradigms, goals and values” (IPBES 2019, 6). While we focus on climate change and decarbonization, sustainability dilemmas also relate to other areas, such as ecosystem governance, biodiversity loss, and food systems. These challenges present themselves in various locations and levels of organization, from the local to the global. Although the problem structures of different sustainability issues vary across cases and contexts, we argue that three general challenges stand out when scrutinizing the relationship between democracy and sustainability: *reformist incrementalism*, *(de) politicization*, and *imaginary boundaries*.

Too little, too slow? Reformist incrementalism

Recent publications by Lindvall (2021) and Marquardt and Lederer (2022) argue that policy makers and civil society organizations often perceive democratic decision-making as too slow to deal with the urgency of global sustainability threats. While democracies exhibit variation in the types and numbers of environmental policies employed and performance in terms of sustainability outcomes (Povitkina and Jagers 2022; Lindvall and Karlsson 2024), they (along with other types of governance systems) have a general problem with addressing long-term sustainability issues that lack straightforward technical solutions, affect future generations, and produce negative externalities outside their jurisdictions (Wurster 2022).

Instead of large-scale – and often disruptive – transformations, democracies tend toward carefully balanced incremental reforms, thereby avoiding societal conflicts and systemic change. The tendency of democracies to avoid political contestation over climate change can be partly explained by insufficient voter pressure and social and psychological barriers that demotivate voters from demanding action for something that seems distant in time and space, impersonal, and complex (Jacobs and Matthews 2012; Lorenzoni, Nicholson-Cole, and Whitmarsh 2007). In addition, the presence of “veto players” helps explain slow, stepwise, and haphazard policy implementation (Madden 2014). According to Hausknost (2020), advanced industrialized democracies are incapable of structural, systemwide changes beyond technological advancements and efficiency gains. They have reached a “glass ceiling of transformation” (Hausknost 2020, 19). Put differently, democracies rely on political compromises or even consensus to implement changes, which seems incompatible with the urgency that humanity faces when dealing with global environmental threats like climate change.

Notably, liberal democracies struggle to overcome the status quo upheld by vested interests. Fossil-fuel lobbying has successfully prevented, delayed, and captured climate politics (McCright and Dunlap 2011; Nasiritousi 2017; Stoddard et al. 2021). While not exclusive to liberal democracies, corruption and weak state capacity further undermine the ability to deliver effective climate policymaking (Sommer 2020; Povitkina 2018). Active citizens often regard electoral democracy as a remedy that enables them to criticize and remove corrupt leaders. However, (re-)elections and electoral dynamics also make liberal democracies prone to short-termism, which excludes concerns of future generations from political decision-making processes. While some scholars have used the slow pace of democracy as an argument for eco-authoritarianism (Beeson 2010; Mittiga 2022), others have reasoned that only democracies have the potential to effectively address the environmental threats of the Anthropocene through deliberation, new democratic practices, and people’s participation beyond the electoral process (Quent, Richter, and Salheiser 2022; Marquardt 2025) – provoking calls for deeper institutional reforms (Dryzek and Pickering 2017; Patterson 2021) and increased responsiveness through concepts like reflexive democracy (Feindt and Weiland 2018).

Too consensus-oriented? (De)politicization

A second challenge for liberal democracies relates to how to deal with modes of (de)politicization when tackling sustainability issues, thereby giving and

restricting room for political conflicts. Pepermans and Maesele (2016) summarize the tension between depoliticization and politicization by distinguishing between a “consensus-building perspective” and a “critical debate perspective.” Proponents of the former argue that politicizing climate change – described as “the suppression and/or amplification of climate science by special interests for political reasons” (Pepermans and Maesele 2016, 479) – hinders climate action. In contrast, the critical debate perspective highlights the need to re-politicize climate change to reinvigorate democratic discourse and civic engagement (Machin 2022; Kenis and Mathijis 2014). However, this can also tip over into populist discourse, where some actors criticize climate action as undemocratic and claim to represent the “will of the people.” Indeed, scholars have shown how right- and left-wing populists have challenged the institutional setup to reject climate action or promote authoritarian modes of governance to tackle sustainability challenges (Fiorino 2022; Marquardt and Lederer 2022).

At the same time, scholars warn that depoliticizing sustainability issues through evidence- and science-based politics runs the risk of closing down debates around environmental threats (Swyngedouw 2011). Depoliticization means avoiding or silencing controversies, often through professionalization, technicization, and delegation of responsibilities to administrative bodies (Feindt, Schwindenhammer, and Tosun 2021). The resulting post-political condition marks a consensus based on scientific evidence, rationality, and undeniable facts, and leaves the existing social and political order largely unchallenged (Crouch 2019; Marquardt 2024). However, most policies have distributional consequences. Thus, if governing authorities do not acknowledge local realities and existing structures of inequality, sociotechnical innovations geared toward a low-carbon society risk causing adverse side effects, exacerbating injustices, and leaving vulnerable groups behind (Bulkeley and Castán Broto 2014; Sovacool et al. 2019). Processes of politicization and re-politicization problematize depoliticized modes of governance by moving sustainability concerns beyond techno-scientific considerations to the realm of politics.

Too conformist? Imaginary boundaries

Finally, modern liberal democracies are constrained in their ability to envision systemic changes and reimagine society as we know it. A dominant growth-oriented ecomodernist imaginary emphasizes the role of scientific advancements and builds on techno-optimism to solve sustainability issues like climate change (Crutzen 2002). Liberal democratic societies

are not only “locked into” carbon-intensive structures and institutions (Seto et al. 2016) but are also entwined with free markets and powerful economic stakeholders reluctant to rethink the social, political, and economic system. Thus, solutions to sustainability challenges are often proposed within the established social and political order. Under neoliberal capitalism, technofixes, growth-oriented decarbonization, and market-driven transitions point to a limited capacity for fundamentally reimagining sustainable societies and anticipating alternative futures (Yusoff and Gabrys 2011; Stoddard et al. 2021). Dominant ecomodernist imaginaries based on green growth and technological progress suppress more radical and potentially transformative ones (Marquardt and Nasiritousi 2022). At the science-policy interface, diverse ways of knowing could lead to more creative and ambitious imaginations of the future. However, modelers and policy-makers often hold on to well-established, status-quo-oriented academic practices of knowing and envisioning the future. Some scholars have criticized these modes of consensus-making as a distraction from political conflicts arising from sustainability issues (Beck 2019; Beck et al. 2021).

Addressing sustainability challenges is not only about reducing emissions or preserving “natural” environments within defined “planetary boundaries” (Rockström et al. 2023). Instead, competing norms, ideas, and future visions are attached to governing sustainability (Hulme 2009; Machin 2020). Competing imaginaries point at societal conflicts, but the dominance of narrow interests in decision-making can prevent the ability to reimagine social and political order “beyond the status quo of a fossil-dependent society” (Marquardt and Nasiritousi 2022, 621). These imaginary boundaries result from a lack of voice and inclusion for marginalized actors in formal democratic institutions as part of processes where discourses are framed and decisions are made (Buschmann and Oels 2019).

In sum, tackling sustainability challenges in liberal democracies requires addressing the challenges of *reformist incrementalism*, forms of *(de)politicization*, and constraining *imaginary boundaries*. While these challenges overlap, they are distinct enough to act as analytical points of departure for exploring the promises and pitfalls of democratic innovations. In the following section, we illustrate how different innovative approaches to democracy relate to them.

Democratic innovations

At their core, democratic innovations cover formalized and often well-institutionalized participatory

and deliberative practices and novel forms of representation, such as deliberative mini-publics or participatory budgeting, which aim to complement traditional forms of electoral democracy. Yet, a broader spectrum of democratic innovations ranges from small-scale deliberative experiments to more fundamental systemwide critique. In principle, these innovations “redraw the traditional division of political labor within representative systems” (Smith 2009, 3). However, they are not neutral policy implementations that aim for more efficient, rational governance. Instead, they should be understood as interventions in the political landscape, engaging with competing interests, value systems, and power. They can offer an opportunity to articulate, share, and debate well-reasoned views that can be supported by stories and informed by emotions and ethical perspectives. While there is evidence for the prospects of innovations to revitalize traditional forms of representative democracy, there is also research indicating that certain deliberative practices have been less successful in augmenting the voices of underprivileged groups and addressing shortcomings of liberal democracy (Webb 2013, Drake, 2023).

In sustainability governance, Baber and Bartlett (2021) argue that democratic innovations can also be used to include aspirations for a more representative citizen voice within existing (global and local) governance settings. However, since innovations embedded in the existing decision-making system are likely limited in their transformative power, the concept should also refer to methods for the autonomous and collective mobilization of citizens in influencing climate policies, improving the sustainability of material flows, or challenging current unsustainable structures and value chains. Democratic innovations can thus have different relations with the democratic state. While some scholars have criticized these developments for a lack of tangible commitments to sustainability, Eckersley (2021), Hysing (2015), and others have identified democratic states as the only actors capable of maintaining the necessary role of facilitators and accelerators of sustainability transformation. For example, while Eckersley (2004) has long advocated a focus on changes within the liberal state toward a “green state,” she has also written extensively on the complementarity of more state-focused and experimental innovations. What Eckersley calls ecological democracy 1.0 (a liberal ecological democracy focused on the state) and ecological democracy 2.0 (embodying more materialist approaches to democratic practice) “do different and valuable work; they need each other if they are to flourish” (Eckersley 2020, 229).

Hausknot (2020) identified the introduction of new democratic practices as a possible way to break “the glass ceiling” of state imperatives that have so far hindered this development. Notably, the state is not a unitary actor, and the roles different state actors can and should take to further democratic innovations may vary. For instance, authors like Smith (2009) actively promote democratic innovations and their output (e.g., mini-publics) and guarantee the basic legal frameworks that enable a vibrant and free civil society to experiment and develop new modes of democratic innovations (e.g., material participation), while others like Webb (2013) are more passive in this regard.

In the discussion that follows, we introduce three democratic innovations that partly capture the diversity of the field. These include the currently most salient approaches, namely, deliberative mini-publics, participatory budgeting, and material participation (the latter of which refers to broader systemic issues). There are other examples of democratic innovations, such as citizens’ dialogues, consultations, citizens’ councils, e-petitions, and sustainability walks, which also contribute to the inclusion of citizens. Sustainability walks² can, for instance, generate urban planning that is in tune with ecological needs and popular interests (Lindell and Ehrström 2020), while citizens have used e-petitions to pressure governments to declare a climate emergency.

We focus our inquiry on three specific innovations where we have found empirical evidence for transformative capacity. They are also positioned at three critical stages of the democratic decision-making process. Deliberative mini-publics mirror the representative democratic process, placing randomly selected citizens in a supportive role to the legislative branch,³ while participatory budgeting allows citizens to engage in the financial planning processes of the executive governing branch. Both can help to stimulate public debate and potentially boost the legitimacy of the transformative policies undertaken by governments worldwide. Material participation represents an innovative approach of social movements, connecting democratic participation with engagement in society’s material flows and production system. Importantly, these types of innovations can, through scaling, be connected in a democratic system to enhance citizen engagement and democratic participation (Delina 2020). Our examples allow us to discuss how democratic innovations could contribute to addressing the challenges outlined above. Below, we outline each of them and put them into conversation with the three challenges by drawing on the theoretical and empirical work in the literature.

Deliberative mini-publics

Deliberative mini-publics (DMPs) are a form of citizen participation based on informed deliberation, often using descriptively representative samples of the population (Dryzek et al. 2019; Smith and Setälä 2018). They are often tasked to develop recommendations around particular policy questions. While participants can record minority opinions, DMPs strive to build broad consensus through deliberation procedures. This institutional innovation is especially relevant for governing sustainability challenges as it provides a unique way to link science, knowledge production, and public opinion (Niemeyer 2020; Norström et al. 2020). DMPs allow participants to receive and, in small groups, process and assess evidence from experts, witnesses, or stakeholder groups and share their own “everyday knowledge.” Ideally, allowing deliberations in small groups provides a space for expressing and integrating diverse and marginalized viewpoints. We evaluate how DMPs respond to the three challenges of sustainability governance through two illustrative examples: climate citizens’ assemblies (CCAs) and DMPs for science co-production.

CCAs are DMPs with a dedicated focus on climate change. In recent years, a wave of national, high-profile CCAs has been commissioned to propose solutions to mitigate climate change in a just manner (Boswell, Dean, and Smith 2023). For example, the Irish government asked its citizens how the country could become a climate-action leader (Harris 2021), while the Danish government included citizens’ voices in the discussion around the green transition and the making of national climate policy (Ejsing, Veng, and Papazu 2023). An independent third-party secretariat usually facilitates CCAs, and scientists typically serve as expert witnesses tasked with informing citizens’ deliberation from a position of epistemic authority. In contrast, DMPs can also be part of a science-policy interface process and empower citizens to co-produce knowledge with scientists. In this case, citizens contribute experiential knowledge, values, and concerns based on their diverse lifeworlds and can influence the questions asked by scientists or the interpretation of findings.

The latter is exemplified by the Ariadne project, where citizens influenced the scientific advice for Germany’s energy and mobility transition (Ariadne 2023). In another German case, the Biesenthal Forest project (a DMP) and researchers iteratively developed different future scenarios toward sustainability. The DMP evaluated these scenarios and prioritized a “policy mix” based on their values and (scientifically informed) beliefs (Blum 2022). The city council of

Biesenthal, which mandated the DMP, adopted a new forest policy based on the citizens’ recommendations that aims to transform the pine-dominated forest into a more climate-resilient mixed forest (Stadt Biesenthal 2023) and established a new local citizens’ advisory body (“Waldbeirat”) to inform and monitor its implementation (Kowarsch 2023). This is an excellent example of how a coalition of DMPs and researchers can consult and finally convince the city government to develop new policies. However, the preparation of this process in Biesenthal has significantly benefited from existing networks between researchers and local actors that are lacking in many other contexts. DMPs can democratize expertise (Carrozza 2015) and allow for knowledge co-production between academics and other societal actors (Norström et al. 2020). In practice, publicly funded platforms require participation experts to plan and conceptualize deliberative processes. Finally, DMPs could even serve as citizens’ “science courts” empowered to guide or commission scientific research (Pamuk 2021).

Reformist incrementalism: DMPs for science co-production and CCAs can create trust among scientists, policymakers, and other societal actors. They counter typical defects associated with the inability of representative democratic decision-making to enact transformative policies. Not surprisingly, resulting policy recommendations from CCAs tend to outperform existing climate policies in scope and ambition (Lage et al. 2023; Willis, Curato, and Smith 2022). Participants’ selection through sortition and a process that prioritizes science-based knowledge should protect against lobbying efforts from vested interests and provide a forum to scrutinize their claims (OECD 2020). However, these safeguarding measures do not automatically mean that DMPs can bypass existing political tensions and established interests. When invited, stakeholder groups and political parties can engage in DMPs as witnesses or, less directly, through multi-stakeholder advisory bodies (Boswell, Dean, and Smith 2023). Collaborative learning between citizens and scientists can create new “advocacy coalitions” and strengthen openness among policymakers and stakeholders to citizens’ inputs. This was the case at the local level in Biesenthal, where members of the city council increased their trust in the citizens’ advice. Instead of narrowly focusing on cultivating more climate-resilient tree species in the Biesenthal Forest, the DMP fostered a broadening of perspectives. As a result, the Biesenthal city council adopted a forest concept that acknowledged conflicting interests and the multifunctionality and societal values of the forest. Several specific projects were identified, including the designation of a combined recreational and

educational forest, the establishment of a burial forest, and a small-scale forest-grazing initiative. While these proposals reflect a more integrated and ambitious vision, their actual implementation remains pending. Thus, although the publicly visible DMP enabled the city council and the mayor to expand the scope of forest management and move beyond incremental reforms (Blum 2022), the long-term effects of this shift have yet to materialize.

(De)politicization: As dialogue-oriented forums for political deliberation, both CCAs and DMPs for science co-production seek to balance depoliticization and politicization. They acknowledge the importance of climate science and expertise but also consider different perspectives to give participants a holistic picture of the issues. CCA facilitators encourage participants to use expert knowledge to ground their opinions. Similarly, DMPs for science co-production can directly engage with science to make normative assumptions explicit and challenge an apolitical understanding of climate change (Jasanoff 2010). The Ariadne DMP helped incorporate distributional and life-cycle criteria in the scientific assessment of specific technologies. Likewise, the Biesenthal DMP connected sustainability challenges based on research and impact to real-world examples and everyday life locally through the deliberative process facilitated by researchers from nearby institutions. This process enabled selected citizens to share their experiences and visions for the forest in light of broader sustainability challenges. These effects also appeared in CCAs in Denmark and France (Farand 2021; Tønder, Jensen, and Langkjær 2021). In the case of participants, DMPs have been shown to lower polarization, counter manipulation, and increase citizens' political engagement and knowledge about political issues (Dryzek et al. 2019; Grönlund, Herne, and Setälä 2015), and there is evidence suggesting these impacts can be scaled to the broader citizenry (Setälä et al. 2023; Suiter et al. 2020).

Imaginary boundaries: DMPs for science co-production and CCAs broaden imaginary capacities by opening up disciplinary silos and lobby-driven politics. CCA recommendations worldwide show that participants are empowered to capitalize on their imagination and creativity. Various CCAs have presented far-reaching and unorthodox suggestions that break with the status quo and transcend the boundaries of political feasibility. A notable example is the suggestion to include the crime of "ecocide" in the French constitution (Convention Citoyenne pour le Climat 2021). Imagination and long-term thinking can be effectively enhanced by coupling the deliberative process with different foresight methodologies. In Scotland's Climate Assembly (Andrews et al. 2022),

citizens explored future scenarios to illustrate different routes to achieving net-zero emissions. Imaginary boundaries also impact scientists when imagining societal change. DMPs for science co-production could help researchers imagine more ambitious futures and reflect on competing norms, ideas, and visions. Making researchers more responsive to societal and ecological consequences and encouraging them to reach across their disciplinary boundaries supports the re-imagining of more socially embedded and just scenarios. In the Ariadne project, citizens proposed broadening mobility futures that move away from a narrow focus on a simple switch to e-vehicles (e.g., shared mobility, bike- and pedestrian-friendly infrastructure). DMPs for science co-production can stimulate imagination around sustainability policy and science. Bringing various societal perspectives to the table and reasoning together can open a creative thought space for policy and policy-relevant research ideas that challenge bureaucratic constraints and academic detachment.

CCAs and DMPs for science co-production illustrate how DMPs can respond to the three challenges. CCAs have raised public awareness of climate change (Suiter et al. 2020) and inspired citizen participation beyond an assembly's initial scope (Farand 2021). Whether this potential can be transformed into effective action depends on how DMPs are scaled up and integrated into the political system (Suiter et al. 2020) and how they are transmitted to parliaments, governments, civil society, or the broader public. Ongoing research suggests that this transmission depends not only on the formal remit given by the commissioning party but also on the culture and institutional setup connecting the DMPs with the broader political system (Boswell, Dean, and Smith 2023). Robust transmission from the mini-public to the formal decision-making process is typically aided by institutionalized intermediaries, such as public officials or civil society actors, who bridge between competing imperatives, including time, knowledge, and resources, and who can inform and adjust expectations and agendas on both sides of the deliberative process. This kind of transmission has been absent in many national and local CCAs, raising serious concerns about their ability to improve democracy and citizen involvement beyond the current state of affairs (Machin 2023b; Tønder 2024).

As additional points of concern, institutionalizing DMPs could bypass mass participation and social movements, thereby undermining the processes of building up democratic legitimacy and motivating participation (Lafont 2019). In contrast, tensions arising from unclear roles and hierarchical power relations can limit citizens' impact within DMPs, as

witnessed in the Ariadne project (Blum 2024). While there is evidence of CCAs and DMPs overcoming reformist incrementalism, there are no guarantees that they will be able to accelerate the transformation, as their agendas might be constrained (Pfeffer 2024) or their proposals less ambitious or not consistent with public opinions (de Búrca 2020; Wells et al. 2021). This concern is amplified by the temporal dimension of CCAs, which, on the one hand, extends beyond the typical four-year cycle of electoral democracy, allowing for intergenerational dialogues (Smith 2021), but, on the other hand, assumes a linear process of deliberation and decision-making that is at odds with how climate change has and will evolve (Ejsing et al. 2025). The uncertainties surrounding these concerns underscore that we have yet to see what a fully institutionalized CCA can accomplish.

Finally, the standard practice of CCAs and DMPs has mainly been applied in democracies in the Global North, which also limits the perspectives offered in this article. However, democracies in the Global South have explored other less resource-demanding deliberative practices, such as hearings and village assemblies (Curato et al. 2024), which need to be further explored to expand and challenge Eurocentric debates on democratic innovations.

Participatory budgeting

Participatory budgeting (PB) is the direct engagement of citizens in decisions over the use and allocation of resources – usually city or district budgets – that is repeated and deliberative (Sintomer, Herzberg, and Röcke 2008). The central idea is that citizens come up with policy ideas, which are developed into real proposals in a process that involves both public deliberation about what is essential and technical assistance about what is feasible and how a policy would affect the issue. In its most common form, PB was first initiated in the Brazilian city of Porto Alegre (Cabannes 2004). Since then, PB has spread worldwide with growing momentum since 2000. While many jurisdictions took up the original Porto Alegre process as is, others adapted the innovation and its goals to their respective institutional context (Sintomer, Herzberg, and Röcke 2008). Still, the heterogeneity of governance units implies considering PB at any governance level where citizens can allocate the funds directly to concrete projects, whether in cities, counties, regions, or elsewhere.

The case of Porto Alegre shows that PB can improve the functioning of the government, public services, infrastructure, and environmental standards (Calisto Friant 2019). Indeed, PB often explicitly

links to sustainability issues, which has been the case in the Green PB in Lublin, Poland (Falanga, Verheij, and Bina 2021) and the Sustainable PB in Bordeaux, France (Cabannes 2021). Lisbon, Portugal, made its PB sustainability-themed in 2021, framing it as part of the European Green Deal and explicitly connecting it to the sustainable development goals (SDGs) (Falanga, Verheij, and Bina 2021). Also implicitly, PBs feature sustainability concerns, as demands for more livable cities often lead to projects that can foster sustainability. Examples of proposals generated from PBs include reforestation in Luhwindja in the Democratic Republic of Congo and transforming an urban car park into a community garden in San Pedro Garza García in Mexico (Cabannes 2021). In Helsinki's 2020 PB process, 10 percent of the final votes went to project proposals that were explicitly ecological in their focus, and more than 50 percent to issue areas that have an ecological connection, like parks and urban nature, selecting many of them as eligible for implementation (Rask et al. 2021). As highlighted by the examples above, PB is a practice that has been applied in decision-making processes both in the Global North and South (Curato et al. 2024) and in different governance contexts.

Reformist incrementalism: PB can challenge reformist incrementalism by breaking existing power structures. In Porto Alegre, the power landscape was significantly reshaped within the PB process, giving more decision-making weight (per inhabitant) to the poorest parts of the city, and many investments in material necessities and public services were carried out (de Sousa Santos 1998). Whether PB leads to radically different decisions is unclear and is likely dependent on the amount of investment available, and poorly organized procedures can lead to feelings of fake engagement and political apathy (Röcke 2014). Of course, it is not guaranteed that PB decisions promote climate action, and a limitation for PB and its green manifestations is that even after a well-designed deliberation over the details of local governance, there are risks of dominant groups taking over the process and reaching unsustainable decisions. If participation is low and uneven across socio-demographic groups, skilled individuals and groups can use PB to further their dominant positions incrementally. The risk of an “innovation facade” also exists (Spada and Ryan 2017), where having a low-budget PB process allows leaders to hold off necessary reforms via other mechanisms by hiding behind the fact that an opportunity for innovation was offered. Still, PB has been shown to lead to building capacity for collaborative innovation (Pulkkinen et al. 2024).

(De)politicization: PB forces participants to consider technical details and the implementation of

ideas. Citizens need to justify goals and how to get there. PB also forces participants to consider the pros and cons of each budget allocation directly and can thus prevent the adverse effects of depoliticization. The process requires the consideration of technical details, as a PB proposal should be a concrete plan for using a share of the budget. Yet, it keeps the democratic concerns visible, as the process is transparent by, for example, making proposals publicly available and creating rules for implementation through a vote after deliberation. In other words, PB can put some power into the hands of the local population within given institutional boundaries. Ideally, this serves as an antidote to populism, as it is harder to claim to represent the *vox populi* more than a direct, local decision. It is not free from inequality, as more educated and better-resourced citizens can have the skill and time to participate in ways that steer the benefits, and representativeness can be an issue with PB (Rask et al. 2021).

Imaginary boundaries: PB can bring in diverse, local knowledge. In Lisbon, the sustainability PB counteracted engineering-dominated international discourse, improving the quality of urban green space projects (Falanga, Verheij, and Bina 2021). Cabannes (2021) studied 15 cities with participatory budgeting. He found a variety of climate-change mitigation and adaptation projects tailored to local conditions, calling PB “a gold mine for localized solutions” with the capability to unleash imaginative and creative solutions. Learning is built into designing proposals, as individuals with ideas must deliberate with others to create an eligible proposal. Finally, the spread of PB across the globe allows for parallel learning, as organizers can investigate how PB is realized elsewhere and adapt their context-specific versions. These benefits are not automatic: a public that does not understand the scope and goals of PB in the larger democratic context is unlikely to put in the effort to make informed suggestions (Röcke 2014), and the bureaucracy needs to be able and willing to change established procedures. Collaborative innovation depends on joint ownership, the opportunity for mutual transformative learning, and empowered participation (Sørensen and Torfing 2011). A PB can meet these criteria, and the instructive examples described by Cabannes (2021) are likely to emerge only when these criteria are met. PB procedures ensure that the private citizens and the organizing and participating public officials find the space to make something new together and bring it to fruition. PB usually culminates in voting, but the more important activities happen before the ballots are cast.

Material participation

Material participation is a democratic innovation used by social movements and it directs attention to more sustainable and reflexive flows of materials through bodies and communities. This understanding of democratic politics is tied to active participation in the practices and processes of everyday material needs. It includes movements dedicated to successfully redesigning the social and material flows of food systems, energy systems, fashion, and more (Schlosberg and Coles 2016). The core political motivations of these movements include frustration with the status quo, a challenge to the power behind the material flows of basic needs, a desire for justice, and a demand that real sustainability, reconnected to the nonhuman world, be practiced in everyday life (Schlosberg and Craven 2019). Thus, material participation is not about *individual* political consumerism (Micheletti and Stolle 2012), but about *collective* action on *material* participation or social inclusion in everyday material practice and the mutual redesign of systems and flows.

Material participation reaches back to utopian movements, feminist and ecofeminist praxis, civil rights, and decolonial movements (Marres 2012). Movements for more local and sustainable food and energy systems are key areas of such sustainable materialist application. Food movements include the growth of farmers’ markets, community-supported agriculture, local food-policy councils, good food networks, business-startup training, and so forth. Such movements work to reshape food flows to address unsustainable and unhealthy food systems – to construct food systems that are good for farmers, eaters, and the ecological systems in which they are immersed (Winne 2011; Alkon and Guthman 2017). The focus is on developing distinct and sustainable food *systems* and a more transparent relationship between producers and consumers. These types of food movements are increasingly seen as alternative systems of the organization and material flow of food through environments and communities across the globe (Sbicca 2018; Esteva and Prakash 2013). Movements for “energy democracy” are not just about policy change but literally about changing the flow of power through communities and restructuring sociotechnical regimes (Burke and Stephens 2017). Changing infrastructure means changing material relationships of “energyscapes” (Lennon and Dunphy 2024), and energy movements tap into the potential of material shifts in energy systems for democratic transformations (van Veelen et al. 2021).

Reviewing scholarly debates, Kuu-Park et al. (2024) detect a growing focus on materiality in community-energy transitions.

Reformist incrementalism: Political participation is crucial for democratic legitimacy and the representation of individual and collective identities; it is about individual empowerment, autonomy, and a say in the political decision-making process and the development of the broader public good. Those ideals face increasing frustration with and alienation from the stale status quo – exclusion from decisions, constant attacks on various identities, and the decimation of the idea of the public good itself (Crouch 2004; Mair 2013). Part of that alienation is a reaction to the gap between people’s values and the policy development and practice in which they are forced to live. Such frustration has led to growth in the form of democratic politics and participation that is directly about doing, making, and manipulating materials and flows in accordance with one’s values across everyday life.

Central here is the growing sense that *physically doing* things with a view to changing a particular flow of matter – literally, in the case of food movements, getting one’s hands dirty – is important, necessary, and political. This is “do-activism” or activism in practice, on the ground, to make a change (Schlosberg and Craven 2019). Ideally, this could move change forward more quickly, as it can bypass the usual influence of vested interests within the economic and political system and set examples for others and blueprints that can be followed by adapting them to local circumstances. While Blühdorn (2020) crucially notes how difficult it is to achieve impactful and authentic political participation, examples in practice illustrate how meaningful and consequential material participation is likely to mobilize broadly, as material participation can generate a sense of meaning for participants and thereby has the potential to challenge vested capital interests. Still, the recapturing of alternative economic networks by forms of neoliberal capitalism could follow attempts for innovation and change, requiring material and democratic vigilance.

(De)politicization: There have been several critiques of “new materialism” for being apolitical, politically limited, or incapable of addressing systematic constraints and powerful institutions. Washick et al. (2015, 77) argue that with a sole focus on new materialist notions of material vitality, “the scholarly imaginary sparked by new materialist ontologies runs the risk of producing a politics that does not really matter.” Blühdorn (2020, 43) asserts that material practice “cannot plausibly be read as signaling a new eco-political departure” and is, instead, another

example of sustaining the “politics of unsustainability.” His analysis of the post-political does not just lay the blame for the demise of democracy solely at the feet of neoliberalism and corporate power but insists that it is baked into a wide range of institutionalized structures and actors. From this perspective, even material participation that attempts to shift systems of power and participation is still a retreat from “real” politics. They are, rather, simulations of *coping with* rather than *countering* undemocratic and unsustainable practices and so inadequate to the broader political need for change.

On the contrary, the material participation articulated and practiced by food and energy-systems activists, for example, is keenly and simultaneously about ethical material flows and impactful politics. The imaginaries sparked by material participation are explicitly political; actors in such movements understand the creation of more sustainable flows in this way and see their own acts as addressing and implementing what was not being done by other political means (Schlosberg and Craven 2019). Material participation assumes and builds on new materialist approaches but is about more than Bennett’s (2004) “thing power,” Marres’ (2012) “object power,” or Latour’s (1991) idea of nonhuman actants. It is not solely about the *vitality* of actors other than humans, as important as that is. It is action dedicated to changing material flows through communities for political ends of engagement, connectivity, and sustainability. These movements aim to politicize everyday material flows and shift and redesign systems of power. Through this practice, they widen our perception of what is considered within the political realm and what is without.

Imaginary boundaries: Democratic politics faces several constraining imaginaries. The business-as-usual imaginary is denialist, represented by the refusal of powerful industries to rethink systems. Similarly, a doomist imaginary attempts to prevent thinking beyond collapse (Aronoff 2019); and the ecomodernist imaginary focuses on techno-savior hubris and demands a new technological answer to whatever crisis is encountered. On the contrary, actions around material participation illustrate not only new imaginaries but *grounded imaginaries* (Celermajor 2021). In contrast to these genuinely corrupted imaginaries, material participation is about grounding transformative imaginaries in practice and change. In this approach generally and in the food example specifically, we see a grounded imaginary: participants on the ground reworking food systems, designing new and more sustainable food flows through bodies, communities, and environments. These are examples of transformative practice, imaginaries *implemented*

and practiced. As Celermajer (2021) explains, “[s]ometimes such actions follow from a transformative vision, but sometimes they arise from the more mundane need to address breakdowns in the systems on which lives depend.” As Schlosberg and Craven (2019) argue, democratic and ecological forms of material participation are about reestablishing broken social and environmental connectivity.

It should be noted that there are far-right groups that use an anti-democratic imaginary to promote and embody a form of material participation. As Dannemann (2023) observes, German far-right “völkisch settlers” emulate other forms of experimental ecopolitics. While seemingly promising some overlaps and potential bridging with more progressive forms of material participation, this form of experimentation is explicitly linked to authoritarian, nationalist, and xenophobic ideologies and imaginaries. As Dannemann (2023, 9) notes, these might represent a form of sustainability that is an “exclusive and ethno-securitized form of authoritarian sustainability” or, as Chambers and Kopstein (2001) famously warned, an example of a “bad civil society” that simultaneously promotes association and hate. The point is that not all material politics is driven by a democratic imaginary.

Overall, social movement engagements with material participation can be understood as an innovative and experimental democratic practice that has the potential to generate political change. Movements dealing with food or energy flows illustrate how material participation as a tactic and practice strives to control material flows while presenting a transformative vision in response to current forms of unsustainable development.

Promises and pitfalls for sustainability governance

The growing scholarship on democratic innovations outlines a promising vision. Mobilizing citizens’ concerns and knowledge to support transformational governance can accelerate action to tackle various sustainability challenges, from large-scale problems like climate change to small-scale management of neighborhoods, ecosystems, and material flows. Based on the illustrative examples presented here, we argue that strengthening democracy in the face of sustainability challenges requires an experimental and pluralistic effort with a plethora of bottom-up initiatives. Our cases highlight that democratic innovations create novel and creative openings to political inertia. They also offer a response to closed public narratives that lack the necessary ambition and inadequately respond to anxieties over democratic decline.

Innovative democratic practices can widen the scope of inquiry and legitimate situated knowledge, generating trust and directing the focus on specific sustainability problems. They provide various routes to reconnection and learning within and between citizens, stakeholders, scientists, public officials, and politicians, as well as the bottom-up articulation of justice and a “fair” transformation.

Yet, challenges, risks, and limitations become apparent when examining democratic innovations. First and foremost, scholars and practitioners of democratic innovations need to ask and scrutinize who can participate and whose interests are represented in a deliberative process. Besides, co-developing practices with people and authorities can create friction, practical delays, exhaustion, and role dilemmas. Factors including poverty, health problems, and early motherhood are already known to hamper political participation (Lawless and Fox 2001; Naurin et al. 2023; Ojeda 2015). If democratic innovations are to be successful in addressing inequalities in representation and participation, their design needs to take these challenges into account (Baber and Bartlett 2021). Ignoring existing barriers might undermine the progress that the innovations promise. What is more, climate change and other (global) environmental problems tend to generate socioeconomic inequalities, while growing wealth gaps can have negative impacts on democratic participation and political trust (Lindvall 2024). If any democratic pathway is to be successful in achieving the needed ecological transformation, it must be able to approach these deeper socioeconomic dilemmas, structural injustices, and underlying power structures. While some observers may not regard the democratic innovations presented above as sufficiently radical to address these dilemmas, policy recommendations from participatory formats such as the French CCA draw a clear connection between the climate crisis and the socioeconomic effects that any measures have to consider.

Democratic innovations can also encounter resistance, indifference, or mistrust of citizens among power holders within current systems. Rather than bringing about radical green policy proposals, citizens may use democratic innovations to maintain unsustainable practices, especially in societies subject to high levels of distrust and disinformation. They risk contributing to “sustaining the unsustainable” as outlined by Blühdorn (2007) in his critique of liberal democracies more generally. Also, at the international level, calls for inclusion and participation can lead to co-optation and a lack of political debate (Marquardt, Fast, and Grimm 2022). Indeed, there are no silver bullets, but as shown in this article,

there is empirical evidence suggesting that democratic innovations can add new spaces for voice and participation in existing liberal democratic systems. This promise also appears to have reached the population. Empirical evidence shows that DMPs, for example, tend to appeal specifically to those who feel disaffected in representative democracy (Goldberg and Bächtiger 2023; Nabatchi 2010; Bedock and Pilet, 2023) and among groups with weak socioeconomic resources (Pilet et al. 2023). Fears that they would reinforce existing inequalities might thus be overstated.

We have sketched out three layers of criticism directed at the inability of the liberal democratic system to deal with climate change and other sustainability threats. These challenges have prompted some researchers to argue that the democratic project has run its course. Blühdorn (2020), for example, offers the bleak alternatives of authoritarian environmentalism or a liberal democracy that will conserve a politics of unsustainability. Table 1 summarizes how the three democratic innovations presented above relate to the three political challenges and their limitations.

While sympathizing with those deeply disappointed with the sustainability performance of liberal democratic systems, rather than dismissing democracy altogether, we argue for exploring democratic innovations to strengthen inclusive and participatory engagement *within* the imperfect system.

So far, however, most democratic innovations have taken the form of small-scale and issue-specific experiments on the outskirts of the democratic system, generally with a modest direct impact on decision-making. Instead of replacing formalized democratic institutions, democratic innovations can *complement* the formal structures of liberal democracy. As such, democratic innovations can provide an alternative, independent arena for politics, facilitating knowledge exchange and learning, experimentation, political contestation and deliberation, and acting. Such arenas have key roles as venues of performative power, shaping how we talk and think about issues and thus stretching the boundaries of what is imaginable. They can also offer places for activation, engagement, and mobilization directed at formal politics. In addition, democratic innovations can be *integrated* within the democratic system, turning them from individual experiments into everyday government practices to enable more direct influence of citizens on policymaking.

It is important to note that we do not see these innovations as outside challenges to the status quo, advanced by mysterious virtuous actors. Instead, they require active engagement and mandates from those in power, whether issue-specific government agencies, city governments, or parliaments. Famous cases like the Irish citizens' assembly that smoothed the way to the liberalization of abortion rights in the country (Elkink et al. 2020) showcase both the

Table 1. Potentials and limitations of democratic innovations.

	Deliberative mini-publics	Participatory budgeting	Material participation
Innovative approach	Include citizens in legislative and scientific processes to democratize expertise, enable knowledge co-production, and make explicit the value assumptions in climate change discourse.	The direct participation of citizens in decisions over the use and allocation of resources.	Collective action on material participation, or social inclusion in everyday material practice, and the mutual redesign of systems and flows as an extension of the political realm.
Potential to tackle incrementalism	Informed citizens press for action against veto players, drawing on their democratic legitimacy.	Challenge incrementalism by breaking existing power structures and allowing the population's involvement. This can generate reforms through the budgetary policy tool.	Move change forward much quicker, as it can challenge the influence of vested interests on politics and set examples/blueprints for others that can be followed by adapting them to local circumstances.
Potential to tackle (de)politicization	Address populist misunderstanding of science and re-politicize the moral arguments of science-making. Re-politicize the discussion around policy responses to sustainability challenges.	Balance politicization and depoliticization through citizen participation, transparency, and public justification in a democratic approach to budget planning.	It is both about ethical material flows and impactful politics, as actors aim to politicize everyday material flows and to shift and redesign systems of power. Through this practice, they widen our perception of what is considered within the political realm and what is without.
Potential to tackle imaginary boundaries	Citizens stretch the scope of scientific questions and topics to analyze more radical and just scenarios and open up disciplinary silos and lobby-driven politics.	PB can break through imaginary boundaries both through the inclusion of lesser-heard voices from the population and through extensive deliberation processes.	Material participation situates transformative imaginaries in practice and change, arising from possibly mundane acts and inspiring hands-on approaches to change.
Limitations	Given their power as experts, it is unclear if/how scientists learn from citizens. Difficult to embed in formal representative decision-making processes, and potentially contested legitimacy in the wider public.	There are risks of resourceful groups taking over the process and reaching unsustainable decisions.	Meaningful and impactful material participation can be expected to be challenging as vested interested might act in opposition.

powerful impact that these innovations can have, but also the need for system integration. Resting on an institutionalized framework of citizens' assemblies, the assembly's recommendations carried significant weight to bring change to a contentious, slow-moving topic. Of course, this means that CCAs also need to deal with existing political and socioeconomic structures that are responsible for the shortcomings in sustainability politics.

When looking at our examples above, democratic innovations show their greatest strength at the local and regional level, where decision-making processes are more flexible and adaptive and more open to engaging with citizens in accordance with assumptions of polycentric governance (Boyd and Juhola 2015). This does not mean that they do not fit into national-level politics. As we have shown, CCAs can be successfully integrated at this level and lend political weight to more ambitious climate policies. However, local approaches offer a different advantage. Greater proximity to material flows and ecosystems central to different sustainability challenges also means that the challenges in question are more relevant to the lifeworlds of ordinary people. This enables citizens to contribute with experiential evidence and local knowledge to complex issues. While national-level CCAs seem to have the greatest chance of influencing the public debate surrounding climate change and other sustainability issues, many national-level policies need to be implemented locally. These differentiations are helpful, as they clarify how various democratic innovations can contribute to the politics of sustainability, which challenges they are best equipped to handle, and at what level they fit best.

The fact that these forms of democratic participation are more frequently found at the local level and might have a better chance of succeeding is not only a limitation but also a beneficial feature. However, this also means that local politics needs a degree of flexibility that allows citizens to influence and implement sustainable policies. As research into small-scale collective action has long pointed out, if local-level innovations are successfully nested into larger governance structures, higher authority will not undermine local solutions (Agrawal 2001).

While being part of the system risks capture and co-optation by powerful vested interests, democratic innovations have key institutional design features (e.g., sortition which refers to the selection of individuals for a mini-public by means of a suitable random sampling procedure) that may help to avoid this outcome. Yet, limiting responsibilities and power remains a tangible risk for democratic innovations. Examples include restricting engagement to issues

delegated top-down, constraining the scope to uncontroversial issues, manufacturing acceptance for predefined policies, and being unable to influence critical topics. A more performative than substantive form of decision-anchoring can surely prevail when the role of democratic innovations is limited to advice or consultation while agenda-setting remains in the hands of other political actors.

Though this is the case for liberal democracies, we have not touched upon the links between democratic innovations and more participatory and consensus-oriented forms of democracy. Consensus-oriented democracy is often associated with more corporatist systems where economic and social actors collaborate closely with the state. These collaborative models could better facilitate the expression of diverse interests, thereby allowing for innovative approaches to decision-making. Such a collaborative governance approach brings different stakeholders – including businesses, municipalities, and civil society organizations – together but struggles to address systemic changes toward more radical transformation (Marquardt et al. 2024). The “Fossil-Free Sweden” initiative is an illustrative example of a participatory multi-stakeholder approach that has aimed to coordinate between different societal groups to achieve a carbon-free future. However, these collaborating structures can be captured by powerful incumbents, limiting the transformative potential of democratic innovations (Nasiritousi 2024). As industrial players tend to be more formidable than civil society actors in terms of influence, corporatism may promote a more inclusive process, but it also risks reinforcing the status quo if powerful economic actors maintain disproportionate influence.

Economic democracy provides another model that emphasizes workers' control and participation in economic decision-making. It could provide institutional mechanisms to redistribute power and reduce the influence of capital in politics. John Rawls' (1971) concept of “property-owning democracy” suggests an alternative arrangement where power is not merely in the hands of capital owners but is distributed more equitably, allowing for collective agency in shaping economic and political outcomes. The participatory structures within economic democracy could challenge the concentrated power of capital by fostering innovative forms of ownership and control, including cooperative models and participatory budgeting. These mechanisms could, in theory, provide the institutional foundation needed to counterbalance powerful incumbents, enabling democratic innovations to address systemic inequalities (Pateman 1970). Democratic innovations alone are unlikely to fix the systemic problems in modern democratic welfare states. Instead, democratic innovations need

to be aligned with broader economic democratization processes and social movements that can directly confront the power structures upheld by capital. Without this alignment, innovations may remain isolated or co-opted by existing power dynamics, failing to tackle the combined social, ecological, and democratic crises of our time.

The challenge lies in not only fostering participatory or deliberative forms of democracy but also ensuring that these efforts are integrated with structural shifts that democratize economic power, thereby bridging the gap between political and economic spheres (Fraser 1990). Along those lines, Julia Steinberger et al. (2024) outline the need for democratic deliberation in the sphere of economic decision-making to shift the logic of provisioning in liberal democracies – “from a primacy of profit and growth to a primacy of well-being within planetary boundaries” (Steinberger et al. 2024, 10). Lindvall (2024) has moreover argued that climate change and biodiversity loss are likely to change the material conditions for political and democratic mobilization, giving rise to situations that can either be exploited by far-right populists, acting to maintain unsustainable economic models while undermining fundamental democratic principles, or boosting social movements fighting for climate actions and social justice. Exploring innovative democratic models may help to foster this type of social mobilization. In short, as climate change and unsustainability effects become more visible in terms of damaged ecosystems, extreme weather events, and growing societal conflicts, insufficient government responses become evident. Democratic innovations hold the potential to legitimize climate action in contrast to calls for more authoritarian, technocratic governance or a stronger appeal of the simplistic solutions offered by populists. However, risks of inefficacy and fears of political inequality and co-optation remain, as demonstrated by the French CCA whose policy recommendations were either weakened or not implemented at all by the French government (Fabre et al. 2021).

Avenues for future research

We started our endeavor to reconcile democracy and sustainability by highlighting three dominant points of critique against liberal democracies in addressing sustainability issues, raised by scholars like Giddens (2009), Shearman and Smith (2007) and Lindvall (2023). *Reformist incrementalism*, *(de)politicization*, and *imaginary boundaries* are vital challenges that we argue can be addressed and productively tackled through democratic innovations. Carefully designed,

fitting a specific purpose, and recognizing the context in which they are embedded, democratic innovations can help reconcile democracy and sustainability by challenging existing institutional limitations, addressing sociopolitical conflicts beyond technological fixes, and bringing people back to the center of the debate.

A broad range of democratic innovations exists with the potential to address some of the critical challenges of existing liberal democracies. Yet, examining the practicalities and effects of these cases raises many questions and illustrates complexities, dilemmas, and wrinkles in their implementation and contribution to transformative change. While theoretically, they could contribute to remedying democratic challenges, democratic innovations also risk creating tokenism, greenwashing, and severe disappointment, especially if mandates are unclear or expectations are not met. However, well-run processes seem to overcome citizens' cynicism based on previous disappointments from poorly run participatory processes. Therefore, the actual impacts of deliberative innovations for tackling sustainability concerns and ultimately improving the material state of the environment, and the limitations they encounter, should be the subject of future research.

In addition, scholars should further explore the ambivalent role of conflicts, contestation, and politicization in democratic innovations. While politicization and polarization are generally seen as threats to progressive sustainability politics, they can also serve as emancipatory and empowering forces for marginalized and underrepresented people who are usually excluded from political decision-making (Laclau and Mouffe 1985; Mouffe 2018). Democratic innovations could help politicize what previously remained outside the realm of politics and bring societal conflicts to the fore. More broadly, they can allow us to revisit the democratic foundation of sustainability governance (Mert and Marquardt 2022). At the same time, these reflections might contradict contemporary politics, where empowering the demos in inclusive ways seems to lose momentum. Recent elections in countries like the United States, a decline of trust in a democratic system that promotes interest-driven politics and even authoritarian tendencies, and the rise of populism worldwide raise critical questions about the limits of democratizing democracy. We believe that democratic innovations can help navigate and respond to these broader political challenges, but future research needs to explore if and how they develop in times of democratic backlash.

What happens within the multiple formats of democratic innovations often remains within the boundaries of these experimental settings. Attempts

to institutionalize democratic innovations face severe challenges and resistance from existing formal political institutions. Such processes are not well understood but rather undertheorized and generally understudied. Future research should, therefore, expand well beyond the simple translation of citizens' views into the realm of politics and policymaking, which requires a broader focus on the deliberative systems, constituting wider society and elites other than politicians and civil servants. At the same time, democratic innovations are not, per se, sufficient or necessary to address complex sustainability issues. Future research must evaluate how democratic innovations perform and fit into the broader political system, and whether and how they could trigger structural changes to address environmental and socioeconomic challenges in different political contexts – from the local to the global level (Marquardt and Bäckstrand 2022). Indeed, there are multiple avenues for their integration, depending on the particular democratic context in which they are embedded. Democracies perform very differently when tackling sustainability issues such as climate change (Lindvall and Karlsson 2024) – with policy responses ranging from expanding renewable energy capacity over fossil-fuel bans and phasing out internal combustion engines to constitutional rights for Mother Earth. While some governments enact policies due to party preferences, others are pushed by social movements or even courts to provide more progressive action. Thus, the drivers for transformative policies vary, and so does the performance of democratic innovations.

Sustainability-enhancing democratic innovations could be seen as instrumental and potentially at odds with an open-ended, pluralistic representative democracy ideal. However, we argue that safeguarding environmental sustainability should be seen as a fundamental aspect of democracy. As Dryzek and Pickering put it (Hammond, Dryzek, and Pickering 2020, 135), similar to its procedural foundations, “[d]emocracy likewise has ecological preconditions that no democratic process should be able to trump.” In the face of the above-described sustainability crises, constitutional commitments, such as the right to physical integrity, already put pressure on governments to provide their citizens with adequate living conditions. And while some hold that this commitment might necessitate compromises on the procedural front (Mittiga 2022), we argue that these commitments can be upheld by different democratic innovations that stimulate citizens to participate in decision-making processes and promote sustainability at the same time.

We have sought to further the discussion on democratic innovations by showing that there are

many ways in which new forms of participation could address democratic challenges. Future research should provide further knowledge on how democratic innovations perform across different societal contexts. Moreover, it should examine critical questions such as to what extent and under what conditions democratic innovations can overcome *realpolitik* in terms of clientelism, interest politics, and political counterforces to democratic sustainability transitions, including the weakening of democracy in countries around the world. Answering these questions is critical to understanding *how* democratic innovations can not only reconcile democracy and sustainability but also deepen democracy itself.

Notes

1. We use the term “citizens” in this article to refer to a category of political actors that stands apart from, for example, scientists, public officials, politicians, institutions, the government, and others. This is not in reference to legal categories of citizenship that distinguish between citizens and non-citizens of states. While the subject of the democratic processes presented here is “citizens,” we use this concept broadly, involving both legal citizens and other inhabitants within individual states, regions, or municipalities. Citizens are legitimate participants which, depending on the context, can be residents, voters, or even all interested individuals. Such terminology also acknowledges that democratic innovations are not always more inclusive, although they can be.
2. A sustainability walk is a participatory method used to engage local communities in discussions about sustainability policy. Typically, a small group of participants, often including local residents, policymakers, and experts, walk through a specific site (such as a neighborhood, park, or urban area) while discussing environmental, social, and sustainability challenges and opportunities within that location. The walk itself plays a crucial role in the process, as it situates the participants in the physical space they are deliberating about, making the discussion more grounded and relevant to the lived experience of the community. This method facilitates a deeper understanding of local issues, as it allows participants to directly observe and engage with the environment while exchanging ideas and perspectives. Sustainability walks aim to foster informed discussions that are locally driven and context-specific, thus highlighting the importance of local knowledge in policy-making processes. While sustainability walks are a smaller-scale democratic innovation compared to larger DMPs and CCAs, they share a common goal of increasing citizen participation and providing valuable insights for decision-making.
3. While we focus on government-initiated deliberative mini-publics here, these can also be created by the people, scrutinizing government policies. The People's Plan for Nature in the UK is one example.

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